

Comfort Eating by Female College Students in Maharashtra, India

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ABSTRACT

Background: Comfort eating is commonly reported in multiple countries. However, there is not much published scientific literature available about the same. The dearth of information in the Indian context on comfort eating prompted this work.

Methods: Female college students (n=324) from Maharashtra, India were asked about the foods they associated with a sense of happiness, family/childhood, stress relief, and positive and negative emotions after obtaining informed written consent.

Results: Participants listed 105 foods that provided them comfort, 61 traditional and 44 non-traditional. The majority of students associated some foods with a feeling of happiness (98.5%) and family and childhood (99.1%), preferring traditional foods more than non-traditional foods. At least half the participants consumed comfort foods 1-2 times/week, with traditional foods being consumed by more students than non-traditional foods. More than half the students could not control eating certain foods (72.9%). More students found it difficult to control their intake of high-fat and/or high-sugar, and high-fat, high-sodium foods. Overall, 44.7% (n=144) reported that they felt guilty after consuming comfort foods. Among them, 29.8% felt guilty after consuming high-fat, high-sugar foods, 10.5% after high-fat, high-sodium, 38.0% after high-fat, 12.2% after consuming high-sugar foods and 9.5% after consuming low-fat foods.

Conclusion: This study indicates that comfort eating appears to be prevalent in India. The results of the present study point out the need to work in this area and to pay particular attention to comfort food consumption among persons trying to lose weight, those who are under stress or are emotionally perturbed.

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KEYWORDS: *comfort eating, stress, comfort food, emotional eating, negative emotions*

INTRODUCTION

The amount and type of food consumed could be influenced by anxiety and stress [1-4]. Foods may relieve anxiety or stress and evoke a sense of comfort and pleasure [5]. Such foods are known as comfort foods and may be associated with a specific person, place or time [6]; with nostalgia, indulgence, convenience, and physical comfort [7]. Foods like sweets, chocolates, cakes, biscuits, and ice creams have been popularized through marketing strategies and sales promotions as comfort foods. High sugar, fat and/or salt-containing foods may influence mood transiently, reduce tension and enhance pleasant feelings.

However, such comfort foods could adversely affect health [8]. Despite this, comfort eating has not received much attention from nutritionists in India. Given the dearth of information on comfort eating in the Indian context, the present study was undertaken on young urban college-going females in Maharashtra state.

MATERIALS AND METHODS

Ethical Approval: The study was approved by the Inter System Biomedical Ethics Committee (ISBEC/NR-47/KM-JJ/2019 dated 3rd December 2019).

Sample Selection: Three hundred and twenty-four females (18-22 years) were recruited from Nashik (n=138) and Mumbai (n=186) cities in Maharashtra state, India after obtaining informed written consent. Persons were excluded if they suffered from celiac disease/ diabetes/ cancer/ food allergies/ intolerances and had specific dietary modifications/ restricted/ modified diets.

Data collection: An interview schedule consisting of 17 semi-structured questions was used to obtain information about whether any particular food(s)

gave them a sense of happiness, or reminded them of a friend, family member, sibling, parent/grandparent. Also, they were asked whether they associated specific foods with positive and negative experiences. They were asked whether they altered their eating patterns when they were stressed and what was the change. Further, they were asked to list the foods as their first, second, and third preferences respectively as well as foods they liked and disliked. Information about the traditional foods listed is provided in table below.

Name of Food Product	Type of Meal	Major Food Ingredients	Category of Food Product (Nutritional)	Category of Food Product
Gulab Jamun	Dessert	Sugar, Ghee*, Thick Concentrated Milk Solids	High Fat, High Sugar	Traditional
Ras Malai	Dessert	Sugar, Ghee, Milk	High Fat, High Sugar	Traditional
Sheera	Dessert	Semolina, Fat, Milk, Sugar	High Fat, High Sugar	Traditional
Kheer	Dessert	Thickened Milk, Ghee, Sugar, Cereal, Nuts	High Fat, High Sugar	Traditional
Shrikhand	Dessert	Concentrated Curds Without Whey, Sugar, Nuts	High Fat, High Sugar	Traditional
Jalebi	Dessert	Fermented Refined Flour Batter, Deep Fried, Sugar Soaked	High Fat, High Sugar	Traditional
Gud Podi (With Sesame Seeds)	Dessert	Wheat Flour, Jaggery, Sesame Seeds, Ghee	High Fat, High Sugar	Traditional
Til Chikki	Dessert	Sesame Seeds, Jaggery	High Fat, High Sugar	Traditional
Kaju Katli	Dessert	Cashewnuts, Sugar	High Fat, High Sugar	Traditional
Carrot Halwa	Dessert	Carrots, Milk, Ghee, Sugar	High Fat, High Sugar	Traditional
Modak	Dessert	Steamed Rice Flour Dumpling With Grated Coconut, Jaggery Filling	High Fat, High Sugar	Traditional
Karanji	Dessert	Deep Fried Refined Flour Pockets Stuffed With Dry Coconut, Raisins, Nuts	High Fat, High Sugar	Traditional
Mishti Dohi	Dessert	Concentrated Milk Fermented To Curds, Sugar/Jaggery	High Fat, High Sugar	Traditional
Puran Poli	Dessert	Wheat Flour/ Refined Flour, Pulse, Sugar, Eaten With Ghee	High Fat, High Sugar	Traditional

Data analysis: The foods were categorized as traditional and non-traditional foods and within these categories further classified as high-fat high-sugar, low-fat, high-fat, high sugar and high-fat high-sodium foods. Data for the two cities were compared using Pearson's χ^2 (SPSS version 25.0).

RESULTS

The results for the two cities did not differ significantly, therefore, the data is presented for both cities combined regarding types of comfort food consumed and their association with situation, place, and/or person as well as stress.

Traditional and Non-traditional Comfort Foods: Participants listed 105 foods that were mostly high-fat and/or high-sugar. Of these, 61 were traditional with a larger number (n=40) being high-fat and/or high-sugar such as *gulab jamun*, *ras malai*, *sheera*, *kheer*, *shrikhand*, *jalebi*, *gud podi*, *til chikki*, *kaju katli*, *carrot halwa*, *modak*, *karanji*, *mishti dohi*, *puran poli*, *piithas*, *sheer kurma*, and *rasgulla*. Twenty-one were low-fat/low-sugar including *dhokla*, *thepla*, *steamed muthiya*, *daliya*, *upma*, *poha*, *rice with dal/kadhi/rajma*, *makhana*, *homemade sabzis* (vegetables), *aamti*, *dal fry*, *chaas*, *dosa*, *idli*, *besan chilla*, *bhakri*, *chapati*, *sprouted pulses*, *khakhra*. Twenty-three high-fat, high-sodium mostly spicy items were listed, including sandwiches, chaat items, *paneer parantha*,

samosa, kachori, vada pav, misal pav, dabeli, frankie, medu vada, dal batti, chole bhature, pav bhaji, bhujia, farsan, chicken/mutton biryani, fish curry, meat, pork, and prawns.

Forty-four non-traditional foods, mostly sugar- and fat-containing were listed: ice cream, doughnuts, pancakes, waffles, chocolates, cakes, pastries, cold coffee, cheesecake, muffins, milkshakes, cookies and fruit cream. Low-fat/sugar items were soups, low-sugar biscuits, and carbonated diet beverages. High-fat items were pizza, burgers, omelettes, pasta, dumplings, paneer chilli, lasagne, nachos, rolls, cheese, burritos, cheese balls and sausages. High-sugar items were carbonated beverages and mojitos. Twelve high-fat and sodium-containing foods were listed: French fries, Manchurian, instant noodles, chips/wafers, tapioca chips, salty biscuits, extruded snacks, Hakka noodles, fried rice, triple schetzwan rice, mozzarella sticks, burgers with cheese and salt bagels.

Three most preferred foods that give a sense of happiness: Almost all students (98.5%) associated some foods with a feeling of happiness, and traditional foods were preferred by more students (57.8%). Two-fifths (42.2%) of students listed non-traditional foods as their first preference, and one-third to one-fourth of students listed them as their second and third (Figure 1, Table 1).

Overall, high-fat traditional foods were more commonly associated with a sense of happiness, followed by low-fat foods, and then high-fat high-sugar foods. Among the non-traditional foods, both high-fat and high-sugar foods were given first preference, followed by high-fat high-sodium foods. Overall, high-sugar foods (both traditional and non-traditional) were preferred by a very small percentage of the participants (7.5%) (Table 1).

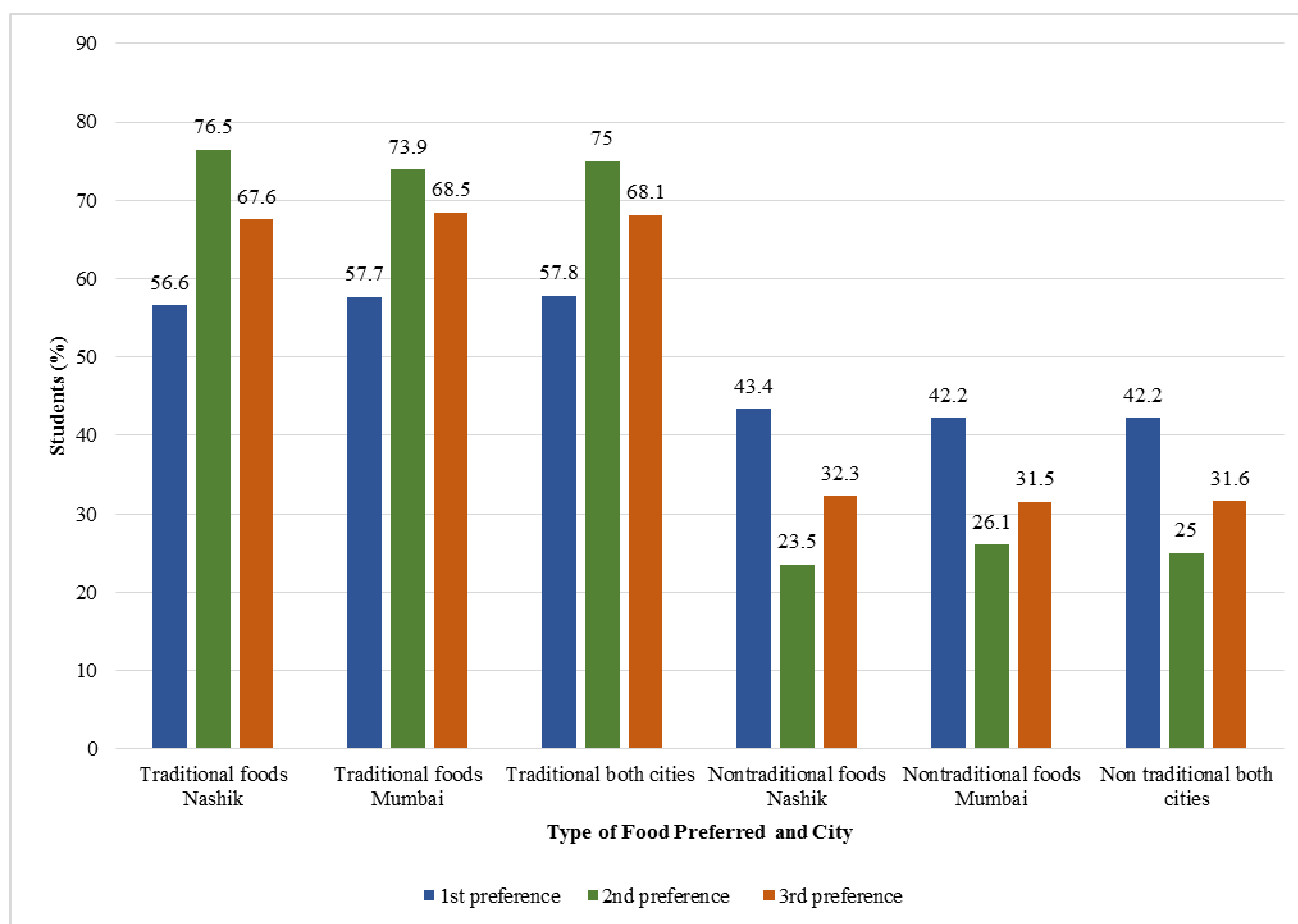


Figure 1: Foods that give a Sense of Happiness: 1st, 2nd and 3rd preferences for foods listed by Students in Nashik and Mumbai (N=320)

Table 1: Categories of Foods listed as 1st, 2nd and 3rd preference by students that give a sense of happiness (n=320)

Categories of foods	First preference N (%)	Second preference N (%)	Third preference N (%)
Traditional foods			
High fat, high sugar	32 (10.0)	13 (4.1)	30 (9.4)
High fat	95 (29.7)	142 (44.4)	114 (35.6)
Low fat	50 (15.6)	80 (25.0)	65 (20.3)
High sodium, high fat	0 (0)	0 (0)	0 (0)
High sugar	8 (2.5)	5 (1.6)	10 (3.1)

Non- traditional foods			
High fat, high sugar	45 (14.1)	7 (2.2)	59 (18.4)
High fat	41 (12.8)	34 (10.6)	29 (9.1)
Low fat	4 (1.3)	0 (0)	0 (0)
High sodium, high fat	29 (9.1)	29 (9.1)	9 (2.8)
High sugar	16 (5.0)	10 (3.1)	4 (1.3)

Among traditional foods sodium- and fat-containing were generally associated with a sense of happiness. Several high-sugar and fat-containing foods were also associated with a feeling of happiness. Some low-fat foods, that were homemade, were associated with a sense of happiness. These included main meal items as well as some traditional breakfast items like *poha*, *idli*, *dosa*, *thepla*, and steamed *muthiya*. Several non-traditional high-sugar and/or high-fat foods were associated with feeling happy. High-fat and sodium-containing foods preferred were mainly from Chinese cuisine as well as snacks like salty chips/wafers, extruded/puffed snacks, salty biscuits, and instant noodles.

Tastes and Textures associated with happiness: Spicy foods were preferred the most, followed by sweet foods, both traditional and non-traditional (Figure 2).

Further students were asked which textures gave them a sense of happiness. Students preferred soft-textured foods, particularly traditional foods like *idli*, *dhokla*, *soft roti*, *paneer* and *dal-rice*. Only a small percentage of students liked hard, tough or gooey-textured foods. Crisp-textured non-traditional foods, mainly fried and sodium-containing, were given first preference by a slightly higher percentage of students as compared to traditional foods, and soft textures were given second and third preference (Figure 3). Crisp traditional foods that were generally fried and contained sodium were listed.

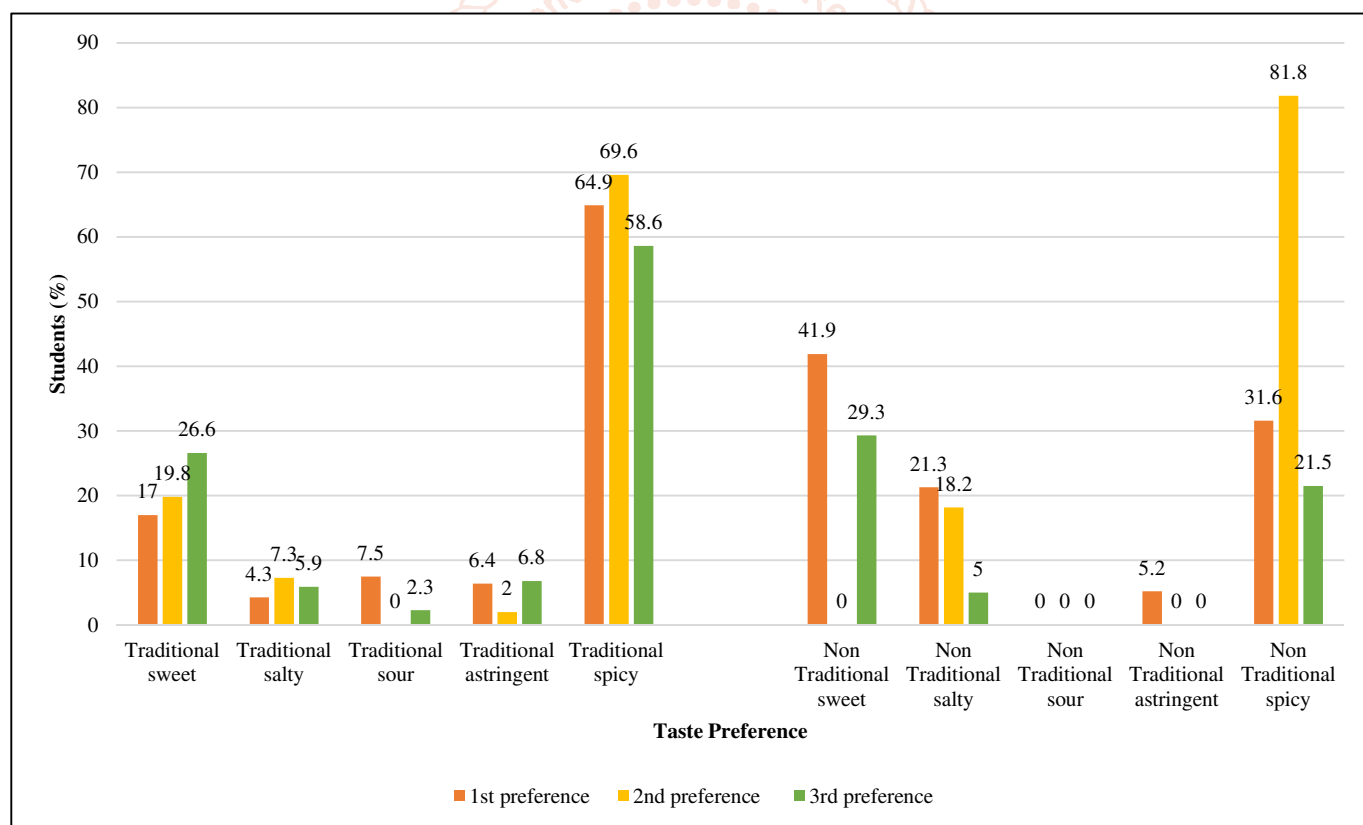


Figure 2: Students' Preferences for the taste of traditional and non-traditional foods

Frequency of consumption of comfort foods: At least half the participants consumed comfort foods 1-2 times/week (Table 2), with traditional foods being consumed by more students than non-traditional foods.

Foods linked with Family/Childhood: Overall, 99.1% (n=321) students associated foods with family/childhood, the majority listed traditional foods (n=307, 95.6%) like *biryani*, *rice+dal/rajma/kadhi*, *puran poli*, *kheer*, etc. A similar percentage (43.0%) associated low-fat traditional foods and 43.6% of students associated high-fat foods with family. Very few students associated high-sugar foods (5.5%) or high-fat, high-sugar foods (5.5%) with family/childhood. Non-traditional foods were hardly associated with family (n=13, 4.0%) and these were high-fat and/or high-sugar foods.

Do food choices change with the situation? Students were asked whether their food choices changed with stress/negative emotions and a majority of students (n=282, 87.0%) responded in the affirmative. They were presented with two specific situations and were asked what they would like to eat in these situations - “If you score less marks in your examination” and “When you have an argument with your close/loved ones”. When they performed poorly in examinations, approximately half of the students preferred traditional low-fat homemade food items (Table 3). When they argued with close family members, nearly two-fifths of the students (42.6%) preferred high-fat traditional foods; 53.0% preferred non-traditional high-fat, high-sugar foods and about one-fourth preferred high-fat, high-sodium non-traditional foods (24.7%) (Table 3).

Further, students were asked whether their appetite changed during stress. A little more than half of the students (58.3%) reported reduced appetite, 35.5% reported increased appetite, and only 5.2% stated that their appetite remained unchanged. Also, they were asked to indicate their level of agreement with the statement “I tend to eat more comfort food when I’m alone”. Overall, 95.7% of the participants tended to eat more comfort foods when alone, with 40.1% strongly agreeing with the statement and 40.1% agreeing moderately. A small percentage disagreed slightly (0.4%), but none disagreed moderately.

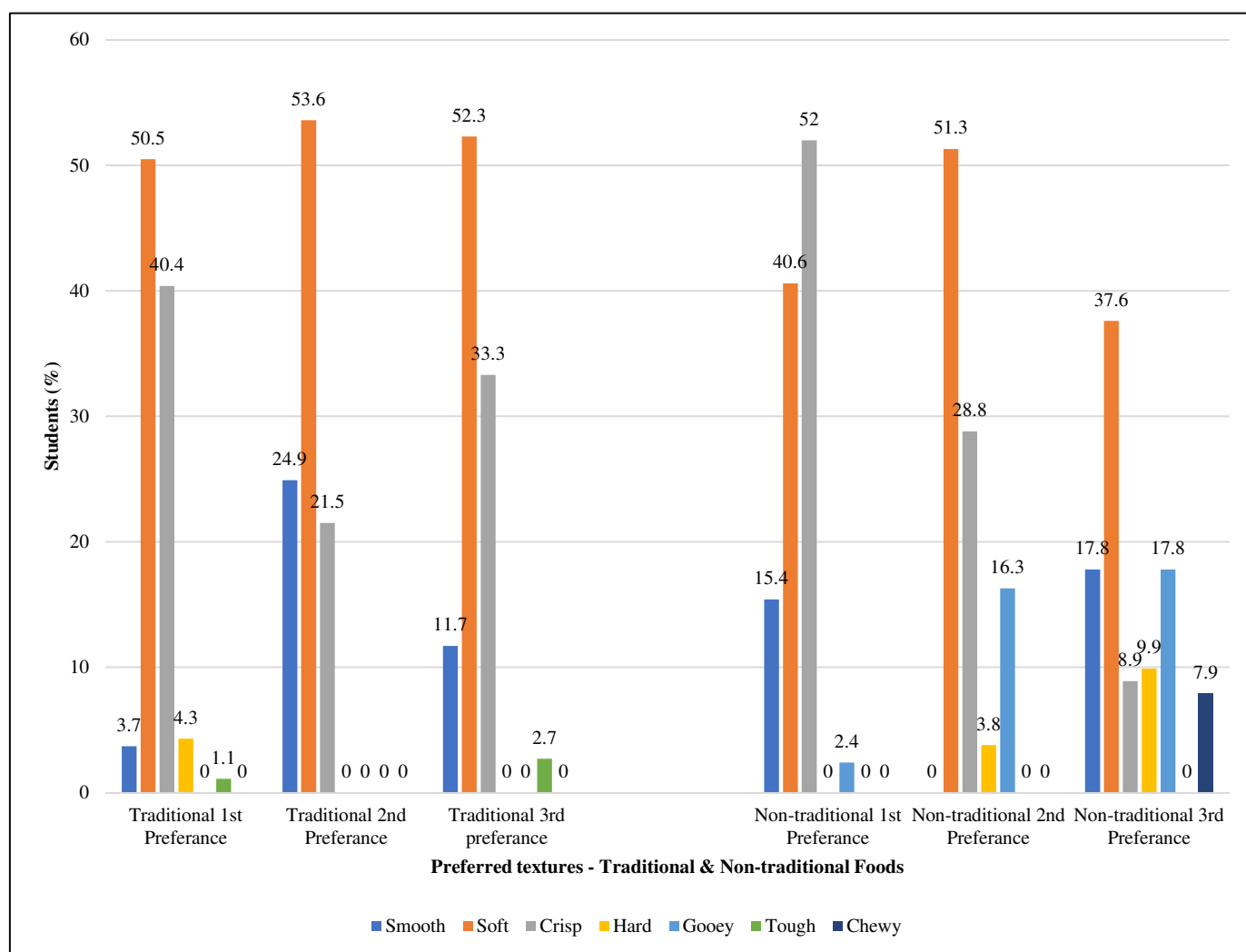


Figure 3: Texture preferences of Students for foods associated with a feeling of happiness

Almost three-fourths of the students (n=237, 72.9%) stated that they could not control eating certain foods (Figure 4).

Among traditional foods, students found it difficult to control eating high-fat foods, whereas higher percentages overall, found it difficult to control their intake of high-fat and/or high-sugar, and high-fat, high-sodium foods.

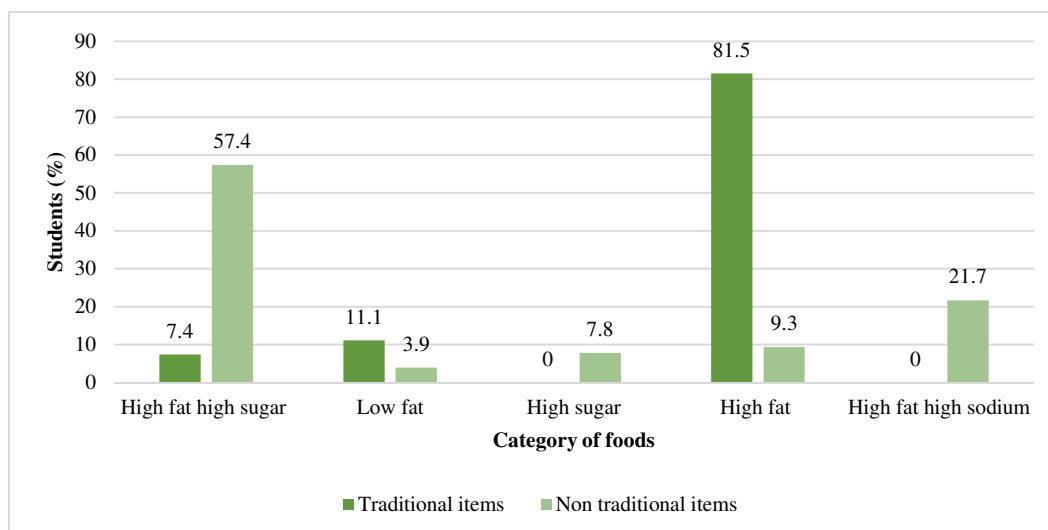
Overall, 44.7% (n=144) reported that they felt guilty after consuming comfort foods. Among them, 29.8% felt guilty after consuming high-fat, high-sugar foods, 10.5% after high-fat, high-sodium, 38.0% after high-fat, 12.2% after consuming high-sugar foods and 9.5% after consuming low-fat foods.

Table 2: Frequency of consumption of traditional and non-traditional foods

Frequency of Consumption	1 st preference N (%)	2 nd preference N (%)	3 rd preference N (%)
Traditional foods			
N	188 (57.8)	244 (75.1)	222 (68.3)
Daily	39 (20.7)	19 (7.8)	61 (27.5)
Once a week	67 (35.6)	63 (25.8)	68 (30.6)
Twice a week	56 (29.8)	115 (47.1)	58 (26.1)
Once a fortnight	17 (9.0)	39 (15.9)	32 (14.4)
Once a month	9 (4.8)	8 (3.3)	3 (1.4)
Non-traditional foods			
N	136 (41.8)	80 (24.6)	101 (31.1)
Daily	24 (17.6)	0 (0)	0 (0)
Once a week	30 (22.1)	19 (23.8)	31 (30.7)
Twice a week	44 (32.4)	34 (42.5)	44 (43.6)
Once a fortnight	21 (15.4)	16 (20.0)	26 (25.7)
Once a month	17 (12.5)	11 (13.8)	0 (0)
<i>% calculated from no of responses obtained</i>			

Table 3: Choices of traditional and non-traditional foods during stressful situations

Food Category	Traditional foods N (%)	Non-traditional foods N (%)
When the student does not perform well in an examination (n=297, 91.4%)		
N	175 (53.8)	122 (37.5)
High fat high sugar	16 (9.1)	62 (50.8)
Low fat	90 (51.4)	11 (9.0)
High fat	67 (38.3)	17 (13.9)
High sugar	2 (1.1)	6 (4.9)
High fat-high sodium	0 (0)	26 (21.3)
When the student has argued with a close/ loved ones (n=302, 92.9%)		
N	136 (41.8)	166 (51.1)
High fat-high sugar	4 (2.9)	88 (53.0)
Low fat	73 (53.7)	0 (0)
High fat	58 (42.6)	26 (15.7)
High sugar	1 (0.7)	11 (6.6)
High fat-high sodium	0 (0)	41 (24.7)

**Figure 4: Percent of students who have a problem controlling the intake of certain food items.**

DISCUSSION

Despite the increasing popularity of comfort foods and the media attention, there are few reports about comfort eating in the published scientific literature [9]. Hence, we studied the consumption pattern of comfort foods by young urban female students.

Comfort foods could be nostalgic or linked with childhood memories, persons or places; or could be indulgence foods or made for special occasions and festivals [10]. They could also be traditionally prepared, particularly by a loved one e.g., mothers/grandmothers, they could have nostalgic/sentimental appeal or a familiarity reminding the consumer of home, family and friends. Similar to reports by Troisi and Gabriel, 2011 and Jones and Long, 2017 [11, 12], participants in the present study consumed traditional foods, and to a lesser extent, non-traditional foods as comfort foods.

Stress, anxiety, negative/emotional thoughts and even relationships can trigger comfort eating Sarmiento et al., 2011 [10], with habits varying among cultures as well as by gender [13-15]. Even in children, stress due to excessive competition and peer pressure could be associated with the consumption of high-fat/high-sugar foods [16]. Stress has been reported to promote excessive intakes of specific food types, especially sweet/calorie-dense foods [17]. Women with stress preferred more high-sugar/high-fat foods compared to those with less stress who preferred low-sugar/low-fat foods [18].

Dubé et al., (2005) [1] reported a higher tendency for comfort eating triggered by negative emotions in women whereas men responded to positive emotions. Similarly, Panza (2015) [17] and Wansink et al., (2003) [19] observed that women chose snack-type high-fat high-sugar comfort foods like chocolates and chips to alleviate negative emotions, whereas men chose meal-type or low-calorie foods like soups for comfort to enhance positive emotions. Panza (2015) [17] also reported that women indulged in comfort eating more than men. A 1992 study by Grunberg and Straub [20] observed a difference in the snacks preferred by men and women when they were stressed. While stress impacted food consumption negatively in men, the reverse was observed in women. Women tended to eat nearly twice as much sweet food and more bland food than men.

Emotional eating, particularly overeating, has been associated with negative emotions. It is likely that such people cannot differentiate between hunger and emotional arousal [21-23]. Troisi and Gabriel (2011) [11] found that people may not necessarily be hungry when they consume food. In this context, the rising prevalence of overweight/obesity is of concern. In a

study of 1500 women, 15.3% were overweight and 43.6% were obese. Also, 59.5% had a higher-than-desirable level of body fat [24]. Consumption of high-energy, high-fat comfort foods is of concern, particularly because the prevalence of overweight and obesity in 20-69-year-old Indian adults is expected to increase from 2010 to 2040 [25].

In the present study, about one-third of the participants reported an increase in appetite when they were stressed whereas a little more than half of the participants reported a decrease in appetite. This indicates that responses to negative emotions can differ among individuals and should be taken into account while counselling obese patients. Thus, people tend to eat comfort foods as a means to improve their mood, or, at least, that is the result they desire from comfort eating. It is often believed that comfort foods will elevate mood when a person needs comfort or is feeling low [6]. It has been reported that choices as well as responses to basic taste, aroma, and texture of food, change according to the mood or stress/negative emotion(s) experienced [18].

Also, some people chose foods to consume only when they were alone [8]. In the present study, a considerable proportion of students reported that they consumed more comfort foods when they were alone, indicating that loneliness could be a trigger for comfort eating. Since loneliness appears a likely factor to increase overeating, it warrants attention especially by nutritionists when working with people for weight management. Another noteworthy observation is that three-fourths of the study participants reported a problem in controlling their intake of certain foods. This could be associated with mood alterations as palatable comfort foods can improve mood rapidly.

In the present study, most of the traditional and non-traditional foods listed by the participants were high-fat, high-sugar foods and only 21 of the 105 foods listed were low-fat/low-sugar foods. Thus, most of the comfort foods were high-fat/high-sugar snack-type foods and sweets, many were also spicy and could have a relatively high sodium content.

Oliver and Wardle (1999) [3] reported increased snacking behaviour in both genders under stressful conditions, while consumption of meal-type foods including fruits and vegetables decreased. Almost a decade later, Kandiah et al., (2006) [2] observed that a majority of college students' (80%) food choices tended to be healthy under normal conditions but when they were feeling stressed only 30% chose healthy foods. The majority of students chose sweet foods - desserts, chocolates, candies, muffins or bars or high-fat mixed dishes - pizzas, tacos, burgers and other fast foods.

In the current study, students associated specific foods, particularly traditional foods, with happiness. More high-fat foods were associated with happiness/positive feelings, although some low-fat traditional foods were also linked. On not performing well during examinations, some preferred low-fat traditional foods whereas others preferred high-fat traditional foods. After arguing with a family member, relatively more students preferred high-fat high-sodium non-traditional foods.

Also, many associated soft-textured traditional foods while others associated crispy traditional or non-traditional snacks with happiness. Several researchers have associated textures and emotions, suggesting that soft foods and smooth mouthfeel could be comforting and nurturing and foods with soft, sweet and smooth textures like mashed potatoes, apple sauce, etc. may be soothing [26-28].

In 2003, Dallman and co-workers [29] proposed that chronic stress increases comfort eating which contributes to an increase in abdominal fat but reduces stress responses. Studies in adolescents and young adults indicate that comfort eating reduces psychological and physiological responses to stress but increases metabolic risk [4, 30-32]. Adverse life events like death in the family were found to be buffered by comfort eating [33]. The consumption of sweet, calorie-dense foods has been linked to the release of opiates and serotonin, which, may help to elevate mood [34,35], noticeably in highly emotional and stressed eaters [36,37].

Studies indicate that many comfort foods are high in energy, sugar and /or fat. Thus, although they may positively affect mood if consumed frequently and in large amounts, they could increase the risk of non-communicable diseases [5]. Young adults who ate more gained more weight and had poorer metabolic health compared to those who ate less during times of stress [38]. Among middle-aged US adults, those who ate more comfort foods had higher levels of blood glucose, insulin, glycated haemoglobin and insulin resistance [39].

In the present study, favourite foods were mostly high-fat foods. It is of concern that a considerable percentage of students preferred comfort foods with high sugar and/or fat content. Sweet, salty and fried or baked foods with high-fat content are pro-inflammatory. High-fat meals have been associated with delayed and prolonged hyperglycaemia and higher glycated haemoglobin levels in persons with type 1 diabetes mellitus. Also, the risk of cardiovascular disease is increased among persons with diabetes. High-fat diets have also been found to result in postprandial pro-inflammatory responses as

well as alterations in the gut microbiota. Diets with high sugar content have also been linked to cognitive impairments, and negative neuroplasticity changes, besides promoting positive energy balance [40,41]. Several inflammatory genes were elevated within two weeks in the hippocampus in rats fed a high-fat and high-sugar diet [42].

All comfort foods need not be unhealthy or nutrient-deficient. As stated by Wansink et al., (2003) [19], they could be healthy, particularly if they are meal-related foods. In the present study, several healthy meal-related foods were listed as comfort foods such as *kadhi chawal*, *rajma chawal*, dal rice, *idli*, sprouted pulses and *dhokla*.

In summary, it appears that comfort eating is likely to be prevalent in India although it has not received as much attention here as in other countries. The results of the present study point out the need to work in this area and to pay particular attention to comfort food consumption among persons trying to lose weight, those who are under stress or are emotionally perturbed.

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